HUNTON& WILLIAMS

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FILE NO: 74096.7

August 5, 2011

VIA E-MAIL AND OVERNIGHT MAIL

Mr. Peter Magolske
U.S. Environmental Protection Agency
Office of Compliance and Enforcement, M/S OCE-127
1200 Sixth Avenue, Suite 900
Seattle, WA 98101

Mr. Brian Monson
Idaho Department of Environmental Quality
1410 N. Hilton
Boise, ID 83706

Re: Sampling and Analysis Work Plan Addendum Off-Site Soil Sampling Plan
Administrative Order on Consent; Nu-West CPO Facility
Docket No.: RCRA-10-2009-0186

Dear Mr. Magolske and Mr. Monson:

Enclosed please find Nu-West Industries, Inc.'s (Nu-West) Off-Site Soil Sampling Plan prepared by WSP Environment and Energy (WSP). This Off-Site Soil Sampling Plan was prepared in response to EPA's letter dated on May 18, 2011; and being submitted to EPA by August 5 in accordance with the EPA's letter dated June 23, 2011.

Accordingly, as required under Paragraph No. 74 of the Consent Order, Nu-West is providing Mr. Magolske with two copies (one hard copy and one electronic) and Mr. Monson with one hard copy of the Off-site Soil Sampling Plan.

HUNTON& WILLIAMS

In accordance with Paragraph Nos. 75 and 76 of the Consent Order, the certification of a duly authorized representative is included as an attachment to this letter.

If you have any questions, please do not hesitate to contact me.

Sincerely,

for P. Scott Burton

cc: Jim Cagle (w/ encl.)
Josh Regan (w/ enc.)

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: James A Castle

Name: JAMES A CASTLE

Title: Lock Manager

Date: 05/04/2011

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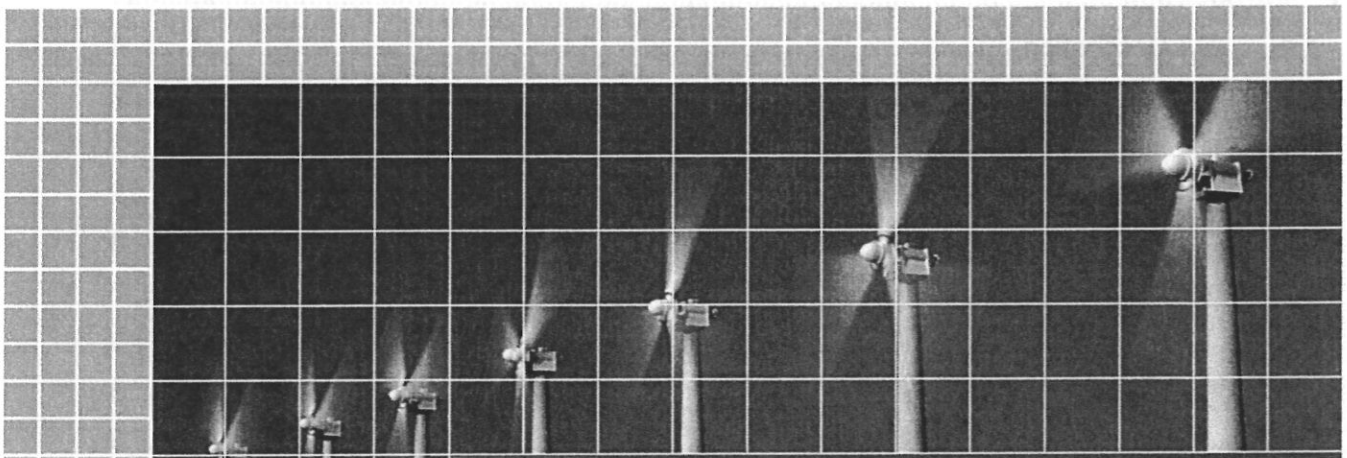
Signature: James A Cagle

Name: JAMES A CAGLE

Title: Risk Manager

Date: 05/04/2011



Off-Site Soil Sampling Plan
Sampling and Analysis Work Plan Addendum
Nu-West Industries, Inc.
Conda Phosphate Operations Facility

August 5, 2011

WSP Environment & Energy
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Suite 930
Denver, CO 800171

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WSP

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Figure 1 – Release Areas
Figure 2 – November 2003 Release Area
Figure 3 – December 2006 Release Area
Figure 4 – April 2009 Release Area
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Table 1 – Summary of Analytical Parameter Lists and Exceedances
Table 2 – Soil Sample Analytical Methods and Requirements
Table 3a – Summary of Human Health Screening Levels
Table 3b – Summary of Ecological Screening Levels (EPA Eco-SSLs)
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1.2 RELEASE HISTORY

Fertilizers are generated at the CPO facility and the waste byproduct is a slurry containing low pH process water and phospho-gypsum solids. The waste is stored in a series of gypsum (gyp) stacks. One of the gyp stacks is identified as the Old Gyp Stack: liquids drain via a decant ditch west of the Old Gyp Stack in the southerly direction to the Cooling Ponds. In 2003, 2006, and 2009, water from the decant ditch system was released, as shown on Figure 1. These three releases are described in greater detail in this section.

1.2.1 2003 Release Background

In November 2003, approximately 4,400 gallons of low pH process water from the Old Gyp Stack (F-GYP-0) was released from the adjacent decant ditch. The release occurred after a portion of the bank associated with the gyp stack sloughed into the decant ditch and dammed the ditch. Water in the ditch then overflowed across the adjacent roadway, presumably entering the low-lying area west of the roadway and north of the West Cooling Pond (Figure 2). Reportedly, the release did not migrate beyond the CPO property boundaries and no characterization of soil conditions was performed.

To assess potential impacts from the 2003 release, sampling and analysis of the on-site spill and nearby off-site areas will be performed.

1.2.2 2006 Release Background

On December 27, 2006, process water was released from the decant ditch adjacent to the Phase I Gyp Stack (F-GYP-1) onto the neighboring Torgesen Ranch in Area A (approximately 10 acres) and Area B (approximately 2 acres), where topographical depressions confined the flow (Figure 3). The footprints shown in the figure are based on a survey conducted at the time of the release; the limits of the release were readily discernable based on snow melt and the fact that the material froze in place. By December 30, 2006, approximately 1.76 million gallons of water/ice were recovered and removed. Crushed limestone was placed in the footprint of the release in both areas to neutralize residual acidity.

In 2007 and 2008, soil samples were obtained from locations in Area A where water had accumulated and frozen. Several constituents were reported at concentrations above the Idaho Department of Environmental Quality (IDEQ) Target Remediation Goals (TRG). Based upon these results Nu-West prepared an ecological risk assessment and an excavation plan. The excavation plan included the removal of soil from areas surrounding the five sample locations with elevated results and the collection of post-excavation verification samples. Several phases of excavation and verification sampling were completed. The excavation phases removed up to 2 feet of soil from the surface of the impacted areas (Figure 3). Once the excavation was complete, the excavated areas were backfilled with clean topsoil.

Analytical results for five post-excavation samples were collected on behalf of Torgesen Ranch. The analytical results indicated that in three of the five post-excavation samples concentrations of chromium, cadmium, selenium, and vanadium exceeded the TRGs, and suggested the response action may have been incomplete.

Based on these data, and in accordance with the data quality assurance and data quality objectives established in the Work Plan, additional sampling will be performed to further evaluate soil quality in the areas on the Subject Property potentially impacted by the 2006 release.

1.3.5 Develop a Decision Rule

The investigation activities include the generation of chemical and radiological data for soil. The data will be compared to screening levels to determine the need for and scope of additional activities. The sampling and analytical methods described herein are adequate to meet these objectives.

1.3.6 Specify Limits on Decision Errors

Decision errors occur when data are misleading, resulting in selection of an inappropriate response actions. Such errors may occur as a result of sampling design error and/or measurement error. To minimize and control the potential for decision errors, this Sampling Plan utilizes MIS and analytical methods that provide RLs, MDLs, or both that are lower than the screening levels. Sections 3 and 4 address these issues.

1.3.7 Optimize the Design for Obtaining Data

The scope of the activities described in this Sampling Plan will be able to determine the nature and extent of environmental impacts associated with the three releases.

1.4 WORK PLAN FORMAT

The subsequent sections address the following subjects:

- Section 2 - constituents of potential interest
- Section 3 - MIS approach
- Section 4 - protocols and procedures for sampling and analysis
- Section 5 - analysis of the data
- Section 6 - reporting

Sections 7 and 8 provide references and a list of acronyms.

3 Multi-Incremental Sampling Approach

Soil potentially impacted by the releases will be characterized using MIS as described in this section.

3.1 DECISION UNITS

Identification of the DUs was based on several factors, including:

- nature of the release
- extent of the release
- exposure unit considerations

The releases were largely comprised of process water but also contained solids. Consequently, potential impacts are likely to be most notable at the surface and, particularly for the 2006 release areas, the impact associated with the solids may vary along the length of the release area due to settling.

The 2003, 2006 and 2009 release areas have been divided into nine DUs, as shown in Figures 2 through 4, and are defined below.

- **2003 Release Area – 2 DUs**
  - The on-site DU is approximately 1.7 acres, extending along the northern boundary of the West Cooling Pond and between the pond liner and the fence line.
  - The off-site DU is approximately 2.7 acres, extending west from the 2009 release area to the western limit of the West Cooling Pond (generally similar to the on-site DU) and between the fence line and the northern limit of the 2009 release.
- **2006 Release Area – 6 DUs**
  - Area A of the 2006 release area is divided into five DUs (A1 through A5), divided along the length. These five DUs range in size between 3.8 and 8.5 acres, incorporating release areas ranging between 0.6 and 2.9 acres. The largest (A3) reflects that area where soil excavation and placement of limestone/fill occurred in 2008; the smallest (A5) reflects the final segment of the release that flowed through a culvert.
  - Area B of the 2006 release is one DU is approximately 6.7 acres, incorporating an approximate 3.7-acre release area.
- **2009 Release Area – 1 DU**
  - The single 2009 DU is approximately 0.36 acre; the release area is approximately 0.31 acre.

The extent of the releases ranges between 0.31 acres for the 2009 release area and 20 acres for Area A. Given the relatively larger extent of Area A and potential differences in constituent distribution related to settling of solids, it was appropriate to divide this area into smaller DUs for characterization purposes.

3.2.2 Sample Intervals and Compositing

Because the releases were comprised largely of process water which flowed overland, the greatest potential for impact is in the shallow surface soil. The maximum potential depth of impact associated with the releases is anticipated to be 4 feet below ground surface (ft-bgs) based on soil sample data collected in 2008. In recognition of the nature of the release, the potential for the greatest impact in the near surface, and to eliminate potential dilution by unimpacted soil from greater depth, surface soil samples will be collected from 0 to 2 in-bgs. Samples will then be collected from 2 to 6 in-bgs and thereafter at 6-inch increments to a total depth of 4 ft-bgs (i.e., nine sample intervals).

MIS protocols include the compositing of DU samples from the same intervals to ensure the analytical results are representative of the unit. To address compositional and distribution heterogeneity of the COIs and ensure the representative nature of the results, approximately equal volumes of soil will be collected from each interval for compositing. To generate composite samples for each interval in the range of 1 to 2 kilograms (EPA 2006b and USACE 2009), the individual interval samples will be a minimum of 4 ounces (to account for both radiological and non-radiological sample aliquots). The sample aliquots for individual intervals will be composited in the field (EPA 2011b) and then placed in two 1-liter containers (one each for non-radiological and radiological parameters). Triplicate samples will be similarly composited.

the custody of the analytical laboratory. The person collecting the sample is responsible for the custody of the sample until it is properly transferred or dispatched.

- Field Log Book - The field logbook serves as official documentation of sampling activities. Field logbooks will be constructed of bound, sequentially numbered, water-resistant notepaper, and records will be kept in waterproof ink. Field personnel shall make frequent detailed entries to provide an adequate record of activities conducted during each day on site. SOP #1, Appendix C of the QAPP, provides additional details of required protocol for the field logbook.
- COC Form - A COC form will be filled out simultaneous with sample collection or at the end of each day.

  The original COC form will remain with the samples until their ultimate disposal; one copy of the COC form will be retained by the sampler. The receiving laboratory will sign the original COC form and return one copy with the analytical data package.

  The COC form will include the carrier airbill number (in lieu of a custody signature). The sampler's copy of the air bill will be affixed to this COC form and will become a part of the COC documentation.
- Custody Seals - To complete custody procedures for shipping, each sample cooler or container will be sealed with custody seals signed and dated by the shipper. If broken during transit, the sample custody will be considered compromised (i.e., potential tampering during transit); if unbroken, the integrity of the samples is assumed to be maintained.

4.2 ANALYTICAL PROTOCOLS

Table 2 summarizes the analytical methods (as presented in the Site Work Plan), detection and reporting limits, screening levels, and analytical requirements (e.g., holding time). On receipt of the composited samples, the laboratory will utilize SW-846 Method 8330B (EPA 2006b). This method includes air-drying of the samples, removal of large material (e.g., pebbles, stones, sticks), sieving, prior to subsampling. The objective of these activities, particularly the removal of large material and sieving is to reduce uncertainty in the results that might reflect analysis of larger material that might not be representative of conditions. Subsampling is performed to provide 30 sample aliquots of similar nature for analysis by different methods; further uncertainty is further reduced by using larger than usual sample aliquots (i.e., 10 grams in lieu of 2 grams).

Comparison of the MDLs and laboratory reporting limits RLs indicates (Table 2) that these limits are higher than the screening levels only for Ra-226, Ra-228, Th-230, Pb-210, and K-40. Consequently, the methods are sufficient for the purpose of data analysis (Section 5) for most COIs and parameters for general characterization. The lower screening levels for the radiological parameters, relative to the MDLs and RLs, is not believed to be of concern because background levels of radiation are anticipated to be higher than the screening levels; regardless, there is no available standard method that provides better limits.

All of the samples collected from 0 to 2 in-bgs and 2 to 6 in-bgs will be analyzed on receipt; samples from the remaining intervals will be held.[4] Following calculation of the analytical results based on sample and triplicate results (Section 5), the results will compared to the screening

[4] In the event the surficial soil samples are largely comprised of limestone or other discernible fill material, the next deeper sample will also be initially submitted for laboratory analysis to address the potential that the surficial material result are "masking" residual impacts in the subsurface.

5 Screening Criteria

5.1 SAMPLE CONCENTRATIONS

Sample concentrations for non-radiological and radiological parameters to be used for comparison with the screening levels will be developed following these MIS protocols:

- MIS samples will be collected from each of the nine DUs.
- Triplicate MIS samples will be collected from these DUs:
  - 2003 on and off site
  - 2006 Area A1 and Area B
  - 2009 DU
- The MIS and triplicate MIS results for these five areas will be used to calculate the mean, variance, standard deviation (SD), and 95% upper confidence limit (UCL) for each.
- The triplicate MIS results for Area A1 and the MIS results for Areas A2 through A5 will be used to calculate the mean, variance, SD, and 95% UCL for these five remaining areas.

The 95% UCL concentrations will be compared to the screening levels. If the concentration of any constituent exceeds a screening level, the sample from the next deeper interval will be analyzed, and so on until the constituent concentrations are all lower than the screening level.

5.2 SCREENING LEVELS

5.2.1 Human Health Screening Levels

The screening levels include those for human health for residential and industrial exposure pathways and ecological screening levels. The residential and ecological screening levels will be used to evaluate all off-site data; the industrial levels will be compared to the industrial exposure pathways.

The human health screening levels for non-radiological parameters are the EPA regional screening levels (RSLs; EPA 2011c) and, for ammonia, the IDEQ Idaho default target level. With the exception of total uranium, the EPA preliminary screening goals (PRGs; EPA 2010) will be used for comparison with radiological data. The total uranium results will be compared to the non-carcinogenic RSL which is lower than the PRG.[5]

Table 3a presents the human health screening levels. Screening levels for the carcinogenic parameters are based on a cancer risk of 1×10^{-6}; EPA's acceptable risk range is typically 1×10^{-4} to 1×10^{-6}. The screening levels for non-carcinogens are based on target hazard quotients of 1.0; to account for cumulative adverse effects the screening levels are based on a target

[5] The results for U-234, U-235, and U-238 analysis will be converted from picocuries per gram (pCi/g) to milligrams per kilogram (mg/kg), for comparison with the RSL, using these conversion factors:

U-234, 1 pCi/g = 1.64×10^{-4} mg/kg
U-235, 1 pCi/g = 4.6×10^{-1} mg/kg
U-238, 1 pCi/g = 2.98 mg/kg

6 Reporting

Data and information generated through implementation of the Sampling Plan will be summarized and presented in a report to the EPA. At a minimum, the report will include the following:

- a summary of all tasks completed, including documentation of conformance with protocols
- re-evaluation and potential refinement of the preliminary conceptual site model, including constituent fate and transport beyond the facility boundary
- figures illustrating:
  - the known footprints of the 2003, 2006, and 2009 release areas
  - grid systems and sample locations
  - DU sample results exceeding screening levels at various depths
- tables including the sample and triplicate results, screening levels, and the results of the comparison of the data and screening levels

The report will also include laboratory results, and any relevant photographs.

8 Acronyms

COC	chain-of-custody
COI	constituents of interest
CPO	Conda Phosphate Operation
DQO	data quality objectives
DU	decision unit
Eco-SSL	ecological soil screening level
EPA	U.S. Environmental Protection Agency
GPS	global positioning system
IDEQ	Idaho Department of Environmental Quality
MDL	method detection limit
MIS	multi-incremental sampling
ORNL	Oak Ridge National Laboratory
PRG	preliminary screening goals
QAPP	Quality Assurance Project Plan
RL	reporting limit
RSL	regional screening level
SD	standard deviation
SOP	Standard Operating Procedure
TRG	target remediation goals
UCL	upper confidence limit

Figure

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WSP Environment & Energy, LLC
4600 South Ulster Street, Suite 930
Denver, Colorado 80237
(303) 850-9200
www.wspenvironmental.com/usa

FIGURE 1

RELEASE AREAS

NU–WEST INDUSTRIES, INC.
SODA SPRINGS, IDAHO

PREPARED FOR
Nu–WEST INDUSTRIES, INC.
SODA SPRINGS, IDAHO

Drawn By: JME 08022011
Checked:
Approved:
DWG Name: 00023229–B04

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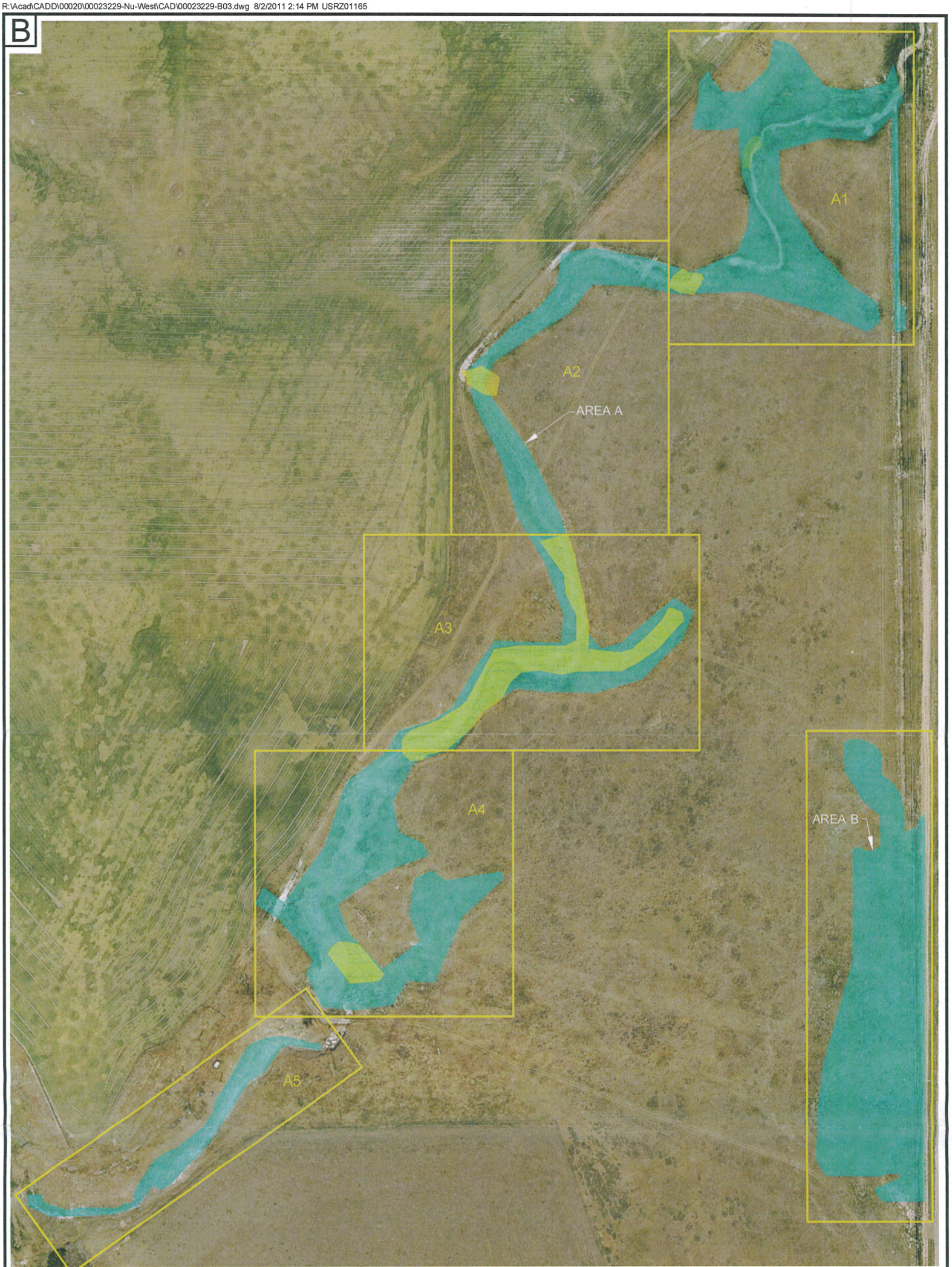

WSP
WSP Environment & Energy, LLC
4600 South Ulster Street, Suite 930
Denver, Colorado 80237
(303) 850-9200
www.wspenvironmental.com/usa

FIGURE 3

DECEMBER 2006 RELEASE AREA

NU-WEST CPO
SODA SPRINGS, IDAHO

PREPARED FOR
NU-WEST INDUSTRIES, INC.
SODA SPRINGS, IDAHO

Drawn By:	JME 08022011
Checked:	
Approved:	
DWG Name:	00023229-B03

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B

Reference: Drawing 09-01-223
Drawn by Agrium, April 27, 2009

N

LEGEND

APRIL 2009 RELEASE AREA

DECISION UNIT

0 15 30 60

SCALE, FEET

WSP Environment & Energy, LLC
4600 South Ulster Street, Suite 930
Denver, Colorado 80237
(303) 850-9200
www.wspenvironmental.com/usa

FIGURE 4

APRIL 2009 RELEASE AREA

NU-WEST CPO
SODA SPRINGS, IDAHO

PREPARED FOR
NU-WEST INDUSTRIES, INC.
SODA SPRINGS, IDAHO

Drawn By:	JME 08022011
Checked:	
Approved:	
DWG Name:	00023229-B03

Drawn By:
Checked:
Approved:
DWG Name: 00023229-B02

NU-WEST INDUSTRIES, INC.
SODA SPRINGS, IDAHO

PREPARED FOR
Nu-WEST INDUSTRIES, INC.
SODA SPRINGS, IDAHO

FIGURE 5

NOVEMBER 2003 RELEASE AREA
MIS SAMPLE GRID

WSP
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750 Holiday Drive, Suite 410
Pittsburgh, Pennsylvania 15220
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www.wspenvironmental.com/usa

B

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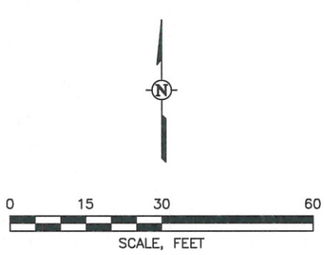
Reference: Drawing 09-01-223
Drawn by Agrium, April 27, 2009



LEGEND

- APRIL 2009 RELEASE AREA
- DECISION UNIT
- MIS SAMPLE GRID

WSP Environment & Energy, LLC
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FIGURE 7

APRIL 2009 RELEASE AREA
MIS SAMPLE GRID

NU-WEST CPO
SODA SPRINGS, IDAHO

PREPARED FOR
NU-WEST INDUSTRIES, INC.
SODA SPRINGS, IDAHO

Drawn By:	JME 08022011
Checked:	
Approved:	
DWG Name:	00023229-B03

Table 1
Summary of Analytical Parameter Lists and Exceedances
Off-Site Soil Sampling Plan
Nu-West Industries, Inc.
Conda Phosphate Operations Facility
Soda Springs, Idaho (a)

Parameters	On-Site Soil Screening Level Exceeds (b)	Site Work Plan Soil Analytical List (c)	Proposed Off-Site Soil Analytical Program	Reason for Inclusion/ (Exclusion)
TAL metals				
Aluminum	na	-	X	general characterization
Antimony	X	X	X	on-site soil exceeds
Arsenic	X	X	X	on-site soil exceeds
Barium	X	X	X	on-site soil exceeds
Beryllium	X	X	X	on-site soil exceeds
Cadmium	X	X	X	on-site soil exceeds
Calcium	nsl	X	X	Site Work Plan requirement
Chromium (total)	-	X	X	Site Work Plan requirement
Cobalt	na	-	-	excluded from Site Work Plan
Copper	na	-	-	excluded from Site Work Plan
Iron	na	-	X	general characterization
Lead	X	X	X	on-site soil exceeds
Magnesium	nsl	X	X	Site Work Plan requirement
Manganese	na	-	X	general characterization
Mercury	-	-	-	excluded from Work Plan and no on-site exceeds
Nickel	X	X	X	on-site soil exceeds
Potassium	nsl	X	X	Site Work Plan requirement
Selenium	X	X	X	on-site soil exceeds
Silver	na	-	-	excluded from Site Work Plan
Sodium	-	X	X	Site Work Plan requirement
Thallium	X	X	X	on-site soil exceeds
Vanadium	X	X	X	on-site soil exceeds
Zinc	na	-	-	excluded from Site Work Plan
General Chemistry				
Fluoride (total)	X	X	X	on-site soil exceeds
Total phosphorus	nsl	X	-	expect interference from agricultural activities
pH	nsl	X	X	Site Work Plan requirement
Total Kjeldahl nitrogen	nsl	X	-	expect interference from agricultural activities
Ammonia as N	X	X	-	expect interference from agricultural activities
Nitrate as N	X	X	-	expect interference from agricultural activities
Radiological Parameters				
Gross alpha	nsl	X	X	Site Work Plan requirement
Gross beta	nsl	X	X	Site Work Plan requirement
Radium-226	X	X	X	on-site soil exceeds
Radium-228	-	X	X	Site Work Plan requirement
Uranium-238	na	-	X	general characterization
Uranium-235	na	-	X	general characterization
Uranium-234	na	-	X	general characterization
Thorium-230	na	-	X	general characterization
Polonium-210	na	-	X	general characterization
Lead-210	na	-	X	general characterization
Potassium-40	na	-	X	general characterization

a/ TAL = target analyte list; N = nitrogen;
"-" indicates parameter not detected above screening level in site soil sample or not required by the Site Work Plan;
"X" indicates parameter included in detected above screening level in site soil sample or required by the Site Work Plan;
"na" indicates analysis not performed;
"nsl" indicates no screening level.
b/ Sample results for 2010 site investigation.
c/ WSP Environment & Energy's Sampling and Analysis Work Plan for Site Characterization (2010).

Table 2
Soil Sample Analytical Methods and Requirements
Off-Site Soil Sampling Plan
Nu-West Industries, Inc.
Conda Phosphate Operations Facility
Soda Springs, Idaho (a)

Parameters	Test Method (b)	Method Detection Limit (mg/kg)	Laboratory Reporting Limit (mg/kg)	Human Health Screening Levels for Soil: EPA RSL Residential (c)	Human Health Screening Levels for Soil: EPA RSL Industrial (c)	Human Health Screening Levels for Soil: IDEQ REM IDTL/ Critical Pathway (d)	Lowest of EPA Ecological SSLs (e)	Ecological Screening Benchmark Reports (f)	Sample Requirements: Container	Sample Requirements: Quantity (grams)	Sample Requirements: Preservative	Sample Requirements: Holding Time
Metals (mg/kg)												
Aluminum	SW-846 6010C	1.2	10	77,000 n	99,000 nm	-	- (g)	-	G	100	none	180 days
Antimony	SW-846 6010C	0.1	1	31 n	41 n	-	0.27	-	G	100	none	180 days
Arsenic	SW-846 6010C	0.1	0.5	0.39 c	1.6 c	-	18	-	G	100	none	180 days
Barium	SW-846 6010C	0.5	10	15,000 n	19,000 nm	-	330	-	G	100	none	180 days
Beryllium	SW-846 6010C	0.05	0.25	150 n	200 n	-	21	-	G	100	none	180 days
Cadmium	SW-846 6010C	0.05	0.2	70 n (h)	800 n (h)	-	0.36	-	G	100	none	180 days
Calcium	SW-846 6010C	5	250	- (i)	- (i)	-	- (i)	-	G	100	none	180 days
Chromium (total)	SW-846 6010C	0.05	0.5	120,000 nm	150,000 nm	-	23 (j)	-	G	100	none	180 days
Iron	SW-846 6010C	1.7	15	55,000 n	72,000 nm	-	- (k)	-	G	100	none	180 days
Lead	SW-846 6010C	0.05	1	400	800 n	-	11	-	G	100	none	180 days
Magnesium	SW-846 6010C	5	250	- (i)	- (i)	-	220	-	G	100	none	180 days
Manganese	SW-846 6010C	0.05	0.75	1,000 n (h)	23,000 n (h)	-	- (i)	-	G	100	none	180 days
Nickel	SW-846 6010C	0.05	2	1,500 n	2,000 n	-	38	-	G	100	none	180 days
Potassium	SW-846 6010C	25	500	- (i)	- (i)	-	- (i)	-	G	100	none	180 days
Selenium	SW-846 6010C	0.2	1	390 n	510 n	-	0.52	-	G	100	none	180 days
Sodium	SW-846 6010C	55	500	- (i)	- (i)	-	- (i)	-	G	100	none	180 days
Thallium	SW-846 6010C	0.13	0.5	0.78 n	1 n	-	- (i)	-	G	100	none	180 days
Vanadium	SW-846 6010C	0.05	2.5	390 n	520 n	-	7.8	-	G	100	none	180 days
General Chemistry (mg/kg)												
Fluoride (total)	EPA 9056A	1	0.5	3,100 n	4,100 n	-	-	-	G	100	4°C	28 days
pH (s.u.)	SW-846 9045D	0.01	0.01	- (i)	- (i)	-	- (g,k)	-	G	100	4°C	ASAP
Eh (mV)	ASTM D1498-76M	0.1	0.1	-	-	-	-	-				
Radiological Parameters (pCi/g) (o)												
Gross alpha	EPA 900	NA	3	- (i)	- (i)	-	-	-	G or Poly	30	None	NA
Gross beta	EPA 900	NA	4	- (i)	- (i)	-	-	-	G or Poly	30	None	NA
Radium-226	EPA 901.1M/HASL-300	NA	1	0.199 / 0.0121 c (m)	3.28 / 0.023 c (m)	-	-	-	G or Poly	250	None	NA
Radium-228	EPA 901.1M/HASL-300	NA	1	0.269 / 0.0292 c (m)	7.56 / 0.0484 c (m)	-	-	-	G or Poly	250	None	NA
Uranium-238	ASTM D3972-09	NA	0.1	4.02 c	29.1 c	-	-	-	G or Poly	30	None	NA
Uranium-235	ASTM D3972-09	NA	0.1	0.192 / 3.95 c (m)	0.348 / 30.9 c (m)	-	-	-	G or Poly	30	None	NA
Uranium-234	ASTM D3972-09	NA	0.1	4.48 / 0.696 c (m)	33.0 / 1.49 c (m)	-	-	-	G or Poly	30	None	NA
Uranium (mg/kg)	ASTM D3972-09 (n)			23 n	310 n	-	-	-	G or Poly	30	None	NA
Thorium-230	ASTM D3972-09	NA	0.1	3.46 c	13 c	-	-	-	G or Poly	30	None	NA
Polonium-210	ASTM D3972-09	NA	0.25	38.2 c	245 c	-	-	-	G or Poly	30	None	NA
Lead-210	liquid scintillation (o)	NA	1	0.335 c	3.76 c	-	-	-	G or Poly	30	None	NA
Potassium-40	EPA 901.1M	NA	~3	0.116 c	0.265 c	-	-	-	G or Poly	250	None	NA

Table 2 (continued)
Soil Sample Analytical Methods and Requirements
Off-Site Soil Sampling Plan
Nu-West Industries, Inc.
Conda Phosphate Operations Facility
Soda Springs, Idaho

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a/ mg/kg = milligrams per kilogram; EPA = U.S. Environmental Protection Agency; RSL = regional screening level; IDEQ = Idaho Department of Environmental Quality; REM = Risk Evaluation Manual; IDTL = Idaho default target level; SSL = soil screening Level; Eco-SSL = ecological soil screening level; mg/kg = milligrams per kilogram; pCi/g = picocuries per gram; G = glass; Poly = polyethylene; °C = degrees Celsius; s.u. = standard units; mV = millivolts; ASAP = as soon as possible; NA = not applicable; "-" not available or not developed; "n" indicates RSL based on non-carcinogenic toxicity; "m" indicates RSL may exceed the ceiling limit; "c" indicates RSL based on carcinogenic toxicity.

b/ SW-846 source:
EPA. 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. As updated and revised.
EPA source:
EPA. 1983. Methods for Chemical Analysis of Water and Waste. EPA 600/4-70-020. As updated and revised.
HASL source:
U.S. Department of Energy. EML Procedures Manual (HASL-300). Environmental Measurements Laboratory. 28th Edition.
ASTM source:
American Society for Testing and Materials.
ASTM D3987-85, Standard Test Method for Shake Extraction of Solid Waste with Water, will be used to prepare samples for analysis of fluoride.
Methods for sample preparation include SW-846 3035B.

c/ EPA RSLs are provided for other than radiological parameters, with the exception of total uranium which is based on non-carcinogenic toxicity. Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm (June 2011). EPA Preliminary Remediation Goals (PRGs) are provided for radionuclides, with the exception of total uranium. Available online at: http://epa-prgs.ornl.gov/radionuclides/ (August 2010).

d/ Idaho REM, July 2004. Available online at http://www.deq.idaho.gov/Applications/Brownfields/index.cfm?site=risk.htm.

e/ EPA Eco-SSLs are available online at http://www.epa.gov/ecotox/ecossl/

f/ Ecological screening benchmark reports available online at: http://www.esd.ornl.gov/programs/ecorisk/benchmark_reports.html. No values are provided; refer to Table 3c for additional discussion on the development of soil screening benchmarks.

g/ The Eco-SSL for aluminum is based on soil pH because the potential toxicity or bioaccumulation of alumnium cannot be reliably predicted based on total aluminum concentrations. Therefore, the ecological SSL for aluminum is identified as a site soil pH less than 5.5 s.u. If the pH is less than 5.5 s.u., aluminum should be retained as a constituent of potential concern.

h/ The RSL for diet is reported for cadmium; the RSL for non-diet is reported for manganese.

i/ To determine potential impacts from the releases, sample concentrations for these parameters will be compared to background concentrations.

j/ The values are for trivalent chromium.

k/ Due to the complex nature of the bioavailabilty of iron to plants and depenedence on site-specific soil conditions, a benchmark for iron was not developed. To evaluate iron, site-specific measurements of pH and Eh should be used to determine the expected valence state of iron and resulting bioiavailability and toxicity. Generally, in well-aerated soils, a pH between 5 and 8 s.u. is not expected to be toxic for iron.

l/ Applicable to subsurface soil.

m/ Both the individual radionuclide PRG and radionuclide plus decay chain series PRG are reported.

n/ The non-carcinogenic RSL (shown) is lower than the non-carcinogenic PRG. The values shown are for soluble uranium salts; there are no RSLs or PRGs for insoluble uranium.
The concentrations for U-234, -235, and -238 will be converted from pCi/g to mg/kg using these formulae:

U-234: 1 pCi/g = 1.64×10^{-4} mg/kg
U-235: 1 pCi/g = 4.6×10^{-1} mg/kg
U-234: 1 pCi/g = 2.98 mg/kg

The results will be summed for comparison with the total uranium screening values.

o/ In-house laboratory method.

Table 3a

Summary of Human Health Screening Levels
Off-Site Soil Sampling Plan
Nu-West Industries, Inc.
Conda Phosphate Operations Facility
Soda Springs, Idaho (a)

		Human Health Screening Levels		
COIs		EPA Residential Soil Screening Level (b)	EPA Industrial Soil Screening Level (b)	IDEQ REM IDTL/ Critical Pathway (c)
Metals (mg/kg)				
Aluminum		7,700 n	9,900 nm	-
Antimony		3.1 n	4.1 n	-
Arsenic		0.39 c	1.6 c	-
Barium		1,500 n	1,900 nm	-
Beryllium		16 n	20 n	-
Cadmium		7 n (e)	80 n (e)	-
Calcium		- (f)	- (f)	-
Chromium (total)		12,000 nm	15,000 nm	-
Iron		5,500 n	7,200 nm	-
Lead		400 n	800 n	-
Magnesium		- (f)	- (f)	-
Manganese		1,800 n (e)	2,300 n (e)	-
Nickel		150 n	200 n	-
Potassium		- (f)	- (f)	-
Selenium		39 n	51 n	-
Sodium		- (f)	- (f)	-
Thallium		0.078 n	0.1 n	-
Vanadium		39 n	52 n	-
General Chemistry (mg/kg)				
Fluoride (total)		310 n	410 n	-
pH (s.u.)		- (f)	- (f)	-
Radiological (pCi/g)				
Gross alpha	α	- (f)	- (f)	-
Gross beta	β	- (f)	- (f)	-
Radium-226	α	0.199 / 0.0121 c (g)	3.28 / 0.023 c (g)	-
Radium-228	β	0.269 / 0.0292 c (g)	7.56 / 0.0484 c (g)	-
Uranium-234	α	4.02 c	29.1 c	-
Uranium-235	α	0.192 / 3.95 c (g)	0.348 / 30.9 c (g)	-
Uranium-238	α	4.48 / 0.696 c (g)	33.0 / 1.49 c (g)	-
Uranium (mg/kg;h)	α	23 n	310 n	-
Thorium-230	α	3.46 c	18 c	-
Polonium-210	α	38.2 c	245 c	-
Lead-210	β	0.335 c	3.76 c	-
Potassium-40	β	0.116 c	0.265 c	-

The EPA screening values provided for non-carcinogenic parameters (n) are 1/10th of the published screening levels to account for cumulative adverse effects.

Table 3a (continued)

Summary of Human Health Screening Levels
Off-Site Soil Sampling Plan
Nu-West Industries, Inc.
Conda Phosphate Operations Facility
Soda Springs, Idaho

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a/ mg/kg = milligrams per kilograms; s.u. = standard units; pCi/g = picocuries per gram; EPA = U.S. Environmental Protection Agency; IDEQ = Idaho Department of Environmental Quality; REM = Risk Evaluation Manual; IDTL = Idaho Default Screening Level;
"n" indicates RSL based on non-carcinogenic toxicity; "m" indicates RSL may exceed the ceiling limit;
"c" indicates RSL based on carcinogenic toxicity; "-" indicates screening level not developed.

b/ EPA Regional Screening Levels (RSLs) are provided for other than radiological parameters, with the exception of total uranium which is based on non-carcinogenic toxicity.
Available online at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm (June 2011).
EPA Preliminary Remediation Goals (PRGs) are provided for radionuclides, with the exception of total uranium.
Available online at: http://epa-prgs.ornl.gov/radionuclides/ (August 2010).

c/ Idaho REM, July 2004. Available online at http://www.deq.idaho.gov/Applications/Brownfields/index.cfm?site=risk.htm.

d/ SW-846 source: EPA. 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.
EPA source: EPA. 1983. Methods for Chemical Analysis of Water and Waste. EPA 600/4-70-020.
ASTM source: American Society for Testing and Materials.

e/ The RSL for diet is reported for cadmium; the RSL for non-diet is reported for manganese.

f/ To determine potential impacts from the releases, sample concentrations for these parameters will be compared to background concentrations.

g/ Both the individual radionuclide PRG and radionuclide plus decay chain series PRG are reported.

h/ The non-carcinogenic RSL (shown) is lower than the non-carcinogenic PRG.
The values shown are for soluble uranium salts; there are no RSLs or PRGs for insoluble uranium.
The concentrations for U-234, -235, and -238 will be converted from pCi/g to mg/kg using these formulae:

U-234: 1 pCi/g = 1.64×10^{-4} mg/kg
U-235: 1 pCi/g = 4.6×10^{-1} mg/kg
U-234: 1 pCi/g = 2.98 mg/kg

The results will be summed for comparison with the total uranium screening values.

i/ In-house laboratory method.

Table 3b

Summary of Ecological Screening Levels
(EPA Eco-SSLs)
Off-Site Soil Sampling Plan
Nu-West Industries, Inc.
Conda Phosphate Operations Facility
Soda Springs, Idaho (a)

		EPA Eco-SSLs (b)			
			Soil	Wildlife	
COIs		Plants	Invertebrates	Avian	Mammalian
Metals (mg/kg)					
Aluminum		- (c)	- (c)	- (c)	- (c)
Antimony		-	78	-	0.27
Arsenic		18	-	43	46
Barium		-	330	-	2,000
Beryllium		-	40	-	21
Cadmium		32	140	0.77	0.36
Chromium		-	-	23 (d)	34 (d)
Iron		- (e)	- (e)	- (e)	- (e)
Lead		120	1,700	11	56
Manganese		220	450	4,300	4,000
Magnesium		-	-	-	-
Nickel		38	280	210	130
Potassium		-	-	-	-
Selenium		0.52	4.1	1.2	0.63
Sodium		-	-	-	-
Thallium		-	-	-	-
Vanadium		-	-	7.8	280
General Chemistry (mg/kg)					
Fluoride		-	-	-	-
pH (s.u.)		- (c,e)	- (c,e)	- (c,e)	- (c,e)
Radiological (pCi/g)					
Gross alpha	α	-	-	-	-
Gross beta	β	-	-	-	-
Radium-226	α	-	-	-	-
Radium-228	β	-	-	-	-
Uranium-234	α	-	-	-	-
Uranium-235	α	-	-	-	-
Uranium-238	α	-	-	-	-
Thorium-230	α	-	-	-	-
Polonium-210	α	-	-	-	-
Lead-210	β	-	-	-	-
Potassium-40	β	-	-	-	-

a/ mg/kg = milligrams per kilograms; s.u. = standard units; pCi/g = picocuries per gram; EPA = U.S. Environmental Protection Agency; Eco-SSL = ecological soil screening level; "-" indicates screening level not developed.

b/ EPA Ecological SSLs are available online at http://www.epa.gov/ecotox/ecossl/

c/ The Eco-SSL for aluminum is based on soil pH because the potential toxicity or bioaccumulation of alumnium cannot be reliably predicted based on total aluminum concentrations. Therefore, the ecological SSL for aluminum is identified as a site soil pH less than 5.5 s.u. If the pH is less than 5.5 s.u., aluminum should be retained as a constituent of potential concern.

d/ The values are for trivalent chromium.

e/ Due to the complex nature of the bioavailabilty of iron to plants and depenedence on site-specific soil conditions, a benchmark for iron was not developed. To evaluate iron, site-specific measurements of pH and Eh should be used to determine the expected valence state of iron and resulting bioavailability and toxicity. Generally, in well-aerated soils, a pH between 5 and 8 s.u. is not expected to be toxic for iron.

Table 3c

Summary of Ecological Screening Levels
(Ecological Screening Benchmarks)
Off-Site Soil Sampling Plan
Nu-West Industries, Inc.
Conda Phosphate Operations Facility
Soda Springs, Idaho (a)

	Ecological Screening Benchmark Reports (b)									
	Wildlife (c)									
Parameters	Little Brown Bat	Short-Tailed Shrew	White-Footed Mouse	Meadow Vole	Mink	Cottontail Rabbit	Red Fox	Whitetail Deer	Rough-Winged Swallow	American Robin
Metals (mg/kg)										
Thallium	0.059	0.027	0.097	0.111	0.042	0.028	0.039	0.068	-	-
General Chemistry (mg/kg)										
Fluoride (total)	319.8	149.4	527.1	602.7	229	151.8	215.4	371.5	-	-
Radiological (mg/kg)										
Uranium	12.802 (d)	5.981 (d)	21.009 (d)	24.129 (d)	9.167 (d)	6.075 (d)	8.622 (d)	14.874 (d)	21.2 (e)	13.2 (e)

	Ecological Screening Benchmark Reports								
	Wildlife (c)							Soil Invertebrates and Microbial Processes	
Parameters	American Woodcock	Cooper's Hawk	Barn Owl	Barred Owl	Red-Tailed Hawk	Wild Turkey	Terrestrial Plants	Earthworms	Micro-Organisms and Microbial Processes
Metals (mg/kg)									
Thallium	-	-	-	-	-	-	1	-	-
General Chemistry (mg/kg)									
Fluoride (total)	10.3	45.1	29.1	66.6	80.6	260	200 (f)	-	-
Radiological (mg/kg)									
Uranium	21.1 (e)	92.4 (e)	59.6 (e)	136.6 (e)	165.3 (e)	533.3 (e)	5	-	-

a/ EPA = U.S. Environmental Protection Agency; mg/kg = milligrams per kilogram; "-" indicates screening level not developed.
Screening levels for belted king fisher, river otter, great blue heron, and osprey are not shown as the release areas do not support their habitats.
b/ Ecological screening benchmark reports available online at: http://www.esd.ornl.gov/programs/ecorisk/benchmark_reports.html.
Ecological screening benchmarks reported, where available, only for those constituents for which no EPA Ecological Soil Screening Level is available.
c/ A No Observed Adverse Effect Level (NOAEL) based benchmark for soil is not available; therefore the NOAEL-based benchmark for food is reported.
A plant uptake factor must be applied to soil data for comparison to the food NOAEL-based benchmark.
d/ The wildlife NOAEL-based benchmark for mammals is based on toxicity testing of the uranyl acetate form.
e/ The wildlife NOAEL-based benchmark for avain species is based toxicity testing of the depleted metallic uranium form.
f/ The ecological benchmark for fluorine is reported.